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EXAMINER

TUCKER, ZACHARY C

ART UNIT	PAPER NUMBER
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1624

DATE MAILED: 03/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/785,229	Applicant(s) KADOWAKI ET AL.	
	Examiner Zachary C. Tucker	Art Unit 1624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 23-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/889,354.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

A Requirement for Restriction for the instant application was mailed 13 January 2006. Applicant's election **without** traverse of the invention of Group I (claims 1-22) in the reply thereto filed on 13 February 2006 is acknowledged.

Claims 23-36 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In independent claims 1 and 4, from which all of 2, 3 and 5-12 depend either directly or indirectly, the first and second steps of the process by which the catalyst is made and the process for making the catalyst are set forth only as intended uses. In other words, the language recited in the first and second steps of claims 1 and 4 only specifies what the first and second steps are *for*, not what *action* constitutes having performed those steps. The invention has not, therefore, been described in claims 1, 4, or any claim which depends from either of those two claims, namely, claims 2, 3 and 5-12.

It is suggested that, in order to resolve this issue, the language "a step for..." be deleted, or the word "for" be replaced with "of" in claims 1 and 4.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4, 5, 7, 8, 11, 12, 13, 15, 16, 18 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 6–72951 (Nagamura et al).

Nagamura et al discloses a process for making esters of carboxylic acids by reaction of the carboxylic acid with an olefin, in the presence of a heteropolyacid catalyst. An automated translation of Nagamura et al, available from the Japanese Patent Office, has been relied upon in making this rejection. Included with this Office action is the Nagamura et al publication, in the Japanese language, and the automated translation of the better part of the document (the “detailed description” part).

Example 1 of the Nagamura et al publication appears in sections [0032] and [0033] of the automated translation. In that procedure, tungstophosphoric acid cesium salt is prepared and impregnated upon wire gauze, which acts as a catalyst support, as specified in the first step of instant claims 1, 4 and 13 (as applicants are aware, “tungstophosphoric acid” is a synonym for “phosphotungstic acid” as the substance is referred to in the instant claims). The supported catalyst was loaded into a “U” shaped stainless steel reactor, which meets the limitation of the third step of instant claim 13, and then a gaseous mixture comprising acrylic acid, ethylene, oxygen, nitrogen and steam fed through the reactor. The product formed was ethyl acrylate.

The catalyst employed in Nagamura et al was contacted with a gas containing water and the lower aliphatic carboxylic acid feed material while *in* the reactor, hence

Art Unit: 1624

the second step limitation of the process by which the catalyst according to instant claim 1 was made, the limitation posed by instant claim 2, the second step limitation of the process of making the catalyst according to instant claim 4 and the limitation posed by instant claim 5, all are thereby met. A process for producing a lower aliphatic carboxylic acid ester, according to instant claims 11 and 12, is also anticipated by Nagamura et al, by virtue of Example 1, since the catalyst according to instant claims 1 and 2 is anticipated, and that catalyst is employed in a process of making said ester from an aliphatic carboxylic acid and an olefin.

During the reaction, the temperature of the reactor reported in Example 1 of Nagamura et al is 150°C, which meets the limitations of instant claims 7 and 15.

Example 1 of Nagamura et al is conducted at a pressure characterized (in the automated translation) as "ordinary pressure," which is taken to represent atmospheric pressure. 1 Atmosphere pressure (1atm) is equal to approximately 0.1MpaG, within the range specified in instant claims 8 and 16.

The limitation posed by instant claim 19 is met by Nagamura et al, because of the fact that the mixed gas employed in the process of Example 1, contains water in the form of steam as well as the lower aliphatic carboxylic acid and olefin.

Claims 1-22 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0 757 027 (Atkins et al), cited by applicants in the Information Disclosure Statement filed 25 February 2004.

Atkins et al discloses in Example 2 (page 14, and Table 10 on page 15) a process for making ethyl acetate from ethylene and acetic acid in the presence of a catalyst, wherein the catalyst is a lithium salt of phosphotungstic acid (Atkins et al refers

Art Unit: 1624

to the heteropolyacid as tungstophosphoric acid, which is synonymous with applicants' nomenclature – phosphotungstic acid) on a silica support, which silica-supported lithium salt of phosphotungstic acid was contacted with a gas containing water, ethylene and acetic acid at about 170°C, while inside the same reactor used in reacting a lower olefin with a lower aliphatic carboxylic acid in a gas phase.

The pressure during the Atkins et al process, Example 2, was 1Mpa (1000Kpa in Table 10).

The total GHSV during the Atkins et al process, Example 2, was 979/h.

Thus, Atkins et al meets each and every one of the limitations posed by instant claims 1-22. The catalyst according to instant claims 1 and 20, the process for producing a catalyst, according to instant claims 2 and 21, and the process for producing a lower aliphatic carboxylic acid ester, according to instant claims 13 and 22, are all anticipated by the Atkins et al publication.

Claims 1-6 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,380,932 (Bielmeier et al), cited by applicants in the Information Disclosure Statement filed 25 February 2004.

Bielmeier et al discloses a catalyst according to instant claims 1-3 and a process for making the same..

The catalyst in Example 1 of Bielmeier et al is a copper salt of phosphovanadomolybdic acid, loaded onto a silica support, subsequently contacted with water vapor.

Claim 2 is included in this rejection because it further limits only the process by which a claimed product is made. The catalyst's presence in a reactor apparatus with a

Art Unit: 1624

particular intended use while being contacted with a gas containing water does not result in a chemical change in the catalyst. The catalyst disclosed by Bielmeier is a copper salt of phosphovanadomolybdic acid, loaded onto a support, which is then contacted with a gas comprising water vapor.

The intended use limitations of instant claims 4 and 5, similar to the limitation posed by instant claim 2, do not serve to patentably distinguish the catalyst of the invention from that taught in Example 1 of Bielmeier et al. Whether the reactor in which the supported heteropolyacid salt catalyst is contacted with water vapor is “for” making an ester, or “for” making methacrolein or methacrylic acid, as is the case with Bielmeier et al, is of no import when considering the actual physical makeup of the catalyst.

Claims 1, 2, 4, 5, 7-13 and 15-19 (insofar as claims 15-19 depend from anticipated claim 13) are rejected under 35 U.S.C. 102(b) as being anticipated by JP 5-170698 (Suzuki et al), cited by applicants in the Information Disclosure Statement filed 25 February 2004. A machine-assisted translation of the Suzuki et al publication, which is part of the file wrapper of the instant application's parent, serial number 09/889,354, was relied upon for the purposes of this rejection.

Section [0020] of the machine assisted translation Suzuki et al, which corresponds to the section of the same number in the original Japanese-language version, discloses the manufacture of tabletted phosphotungstic acid cesium salt catalyst (Suzuki et al refers to the heteropolyacid as tungstophosphoric acid, which is synonymous with applicants' nomenclature – phosphotungstic acid), followed by loading the tabletted catalyst into a reactor for use in the reaction of an olefin and an aliphatic carboxylic acid, and thereafter a contact treatment of the tabletted catalyst for 20hr with

Art Unit: 1624

a mixed gas of nitrogen:acetic acid:steam (75:15:10 v/v), at a temperature of 160°C, and a pressure of 8Kg/cm² (equal to 0.785MpaG), and GHSV in the range of 300-5,000/hr (section [0019]). All of the specified ranges for values of process physicochemical parameters specified in instant claims 7-9 and 15-18 embrace the values for the same which are disclosed in the cited example from Suzuki et al.

Then, the catalyst tablets, while still in the reactor after the gas contacting treatment, is contacted with another gas stream comprised of ethylene and acetic acid, which react in the presence of the pre-treated catalyst, producing ethyl acetate.

Though Suzuki et al does not specifically disclose a step of loading the phosphotungstic acid cesium salt catalyst onto a solid support which is of a different chemical identity than the catalyst itself, said step is implicit in the Example of section [0020] in that reference because all solid catalysts in a tabletted form *are*, in the broadest reasonable interpretation of the term "supported," in fact supported on a support which is of the same chemical makeup as the catalyst. Only the material at the surface of the catalyst tablets participates in catalyzing the reaction between olefin and carboxylic acid; the material on the inside of Suzuki et al's "pillars" of catalyst, is a *de facto* support, and the formation of said "pillars" constitutes the step of loading the catalyst onto a support, as recited in the instant claims.

As evidence that in the broadest reasonable interpretation of "supported," a catalyst comprised of only the catalyst material itself and formed into some shape, is supported on a support which is of the same chemical makeup as the catalyst itself, the examiner directs applicants' attention to the Kirk-Othmer Encyclopedia of Chemical Technology "Catalysts, Supported: 2. Definition of Supported Catalysts" and "Catalysts, Supported: 3. Advantages of Supported Catalysts" John Wiley & Sons, Inc. © 1993,

which is cited by applicants in the Information Disclosure Statement filed 25 February 2004. Section 2 of this reference states that all solid catalysts are in essence supported catalysts, in some sense.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 6, 14 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 6-72951 (Nagamura et al).

Nagamura et al is applied against claims 3, 6, 14 and 20-22 as set forth above in the rejection of claims 1, 2, 4, 5, 7, 8, 11, 12, 13, 15, 16, 18 and 19 under 35 U.S.C. 102(b).

At the time the invention was made, the catalyst according to claims 3 and 20, the process for producing a catalyst according to claims 6 and 21, process for producing an ester according to claim 14 and 22, would have been obvious to one of ordinary skill in the art, given the teaching of Nagamura et al.

The deficiency of Nagamura et al with respect to claims 3, 6, 14 and 20-22 is that the particular group of heteropolyacid salts specified in those claims are not employed in the exemplified embodiments of the invention taught in the Nagamura et al publication. Nagamura et al does, however, expressly suggest salts other than the exemplified cesium salt of heteropolyacid – *inter alia* sodium, magnesium and copper – as other preferred salts of a heteropolyacid for use as a catalyst in the process according to the invention disclosed therein. The student of Nagamura et al, therefore,

Art Unit: 1624

would have found it obvious to substitute a sodium, magnesium or copper salt of phosphotungstic acid for the exemplified cesium salt thereof, in carrying out the procedure describe in Example 1 of the publication. The motivation to do so would have been to make an alkyl ester of acrylic acid, namely ethyl acrylate.

Claims 1, 2, 4, 5, 7-13 and 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 5-170698 (Suzuki et al).

Suzuki et al is applied against claims 1, 2, 4, 5, 7-13 and 15-19 as set forth in the rejection of claims 1, 2, 4, 5, 7-13 and 15-19 under 35 U.S.C. 102(b).

At the time the invention was made, the subject matter according to instant claims 1, 2, 4, 5, 7-13 and 15-19 would have been obvious to the student of Suzuki et al.

The deficiency of Suzuki et al with respect to the instant claims, if there is any, lies in the lack of a specific disclosure of a step of loading a heteropolyacid salt catalyst onto a support material different than the heteropolyacid salt itself.

A supported catalyst, wherein the support is a material such as silica, diatomaceous earth, titania or activated carbon, is expressly suggested in the Suzuki et al publication. Therefore, one of ordinary skill would have found it obvious to conduct the process taught by Suzuki et al, in the examples, with the modification of the heteropolyacid salt catalyst being loaded onto a support material selected from the group of diatomaceous earth, titania and activated carbon.

It is well-known to those of ordinary skill in the chemical engineering arts that supported catalysts offer advantages over catalysts that are not loaded onto an inert support material – a material other than the catalytic substance itself. As evidence that

Art Unit: 1624

this is in fact well-known, the examiner submits Kirk-Othmer Encyclopedia of Chemical Technology "Catalysts, Supported: 2. Definition of Supported Catalysts" and "Catalysts, Supported: 3. Advantages of Supported Catalysts" John Wiley & Sons, Inc. © 1993, cited by applicants in the Information Disclosure Statement of 25 February 2004.

Section three, in the excerpt from the Kirk-Othmer encyclopedia teaches that supported catalysts have the advantage of being less expensive and usually have greater activity than a simple, tabletted pure catalyst material, because they possess a higher surface area per unit mass.

The motivation to employ a heteropolyacid salt catalyst, supported on silica, diatomaceous earth or activated carbon, in the practice of the process taught in Suzuki et al, then, would have been to realize the advantages afforded by such a catalyst in the production of esters.

Clearly then, the process according to instant claims 1, 2, 4, 5, 7-13 and 15-19 is in the teaching of Suzuki et al.

Comment

Claim 20 includes a spelling error – the term "gold salts" is misspelled as "*gold sats.*"

Conclusion

The claims in their present form do not set forth any allowable subject matter. Virtually the same claims as were presented in the parent application, which was finally rejected in view of the prior art, are presented in this continuation application.

Any inquiry concerning this communication should be directed to Zachary Tucker whose telephone number is (571) 272-0677. The examiner can normally be reached Tuesday-Thursday from 8:00am to 4:30pm or Monday from 6:00am to 1:30pm. If Attempts to reach the examiner are unsuccessful, contact the examiner's supervisor, James O. Wilson, at (571) 272-0661.

The fax number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1600.

